

Amdt. dated January 10, 2004

Serial No. 09/687,668
Docket No. SJO920000156US1
Firm No. 0037.0041

REMARKS/ARGUMENTS

The Examiner faxed the Applicants the Advisory action on January 7, 2004. Applicants have yet to receive via mail the Advisory action.

In the faxed Advisory Action the Examiner refused to enter the proposed amendments of the applicants submitted on Sept. 8, 2004. According to the Examiner, the proposed amendments presented additional claims without canceling a corresponding number of finally rejected claims.

In response to the faxed advisory action, and also on the basis of a telephonic interview that was conducted with the Examiner on August 11, 2004, Applicants have rewritten claims 35-38 in independent form and submit that the rewritten claims 35-38 are in a condition for allowance. Additionally, applicants traverse the rejections of claims 1-34 and provide arguments for the patentability of claims 1-34. Grammatical errors and redundancies have been removed from certain claims.

Applicants have also added four new claims numbered 39-42.

Allowable Claims 35-38

The Examiner objected to claims 35-38 as being dependent upon a rejected base claim, but indicated that claims 35-38 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In an interview conducted with the Examiner on August 11, 2004, the Examiner had indicated that redundancies related to the sharing and/or coupling of the first node, the second node, and/or the storage device could be removed while rewriting the claims in independent form.

Applicants have rewritten claims 35-38 in independent form, including all of the limitations of the base claim and any intervening claims, after removal of redundancies and grammatical errors, and certain rearrangement of the claim language. In particular, redundancies

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related to the sharing and/or coupling of the first node, the second node, and/or the storage device have been removed while rewriting claims 35-38 in independent form.

Independent Claim 35

Applicants have rewritten claim 35 in independent form, including all of the limitations of the base claim 1 and the intervening claim 31, after removal of redundancies and grammatical errors, and certain rearrangement and/or changes to the claim language made for clarity.

Amended claim 35 is as follows:

A digital data processing system with access to information stored on a shared storage device, said system comprising a plurality of first nodes and a second node coupled to one another over a communications pathway, the second node being coupled to the storage device for determining meta data including block address maps to file data in the storage device, wherein the storage device is a shared storage device between the first node and the second node, and the first nodes being configured for accessing file data from the storage device using said meta data, wherein said system comprises:

- at least one first node that caches data including meta data for a file accessed by said first node;

- a file application on said first node configured to get requested file data by accessing said cached data for the file; and

- a file notification system that communicates a file change notification to said first node indicating changes affecting the cached data, wherein the file change notification is communicated to the first node by publishing the file change notification via the second node, wherein the file application on the first node inspects the file change notification and if the file change notification indicates that changes that affect the cached data have been made, then the requested file data is obtained from the storage device, otherwise the requested file data is

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directly obtained using said cached data, wherein file accesses may be effected for an extended time with data cached at the first nodes of the digital data processing system.

The requirements of claim 35 that “a file notification system that communicates a file change notification to said first node indicating changes affecting the cached data, wherein the file change notification is communicated to the first node by publishing the file change notification via the second node, wherein the file application on the first node inspects the file change notification and if the file change notification indicates that changes that affect the cached data have been made, then the requested file data is obtained from the storage device, otherwise the requested file data is directly obtained using said cached data” in combination with other requirements concisely express the following limitations by removing redundancies:

(A) The limitation of previously presented claim 1: “file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node inspects the change notification and based on the change notification determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device.

(B) The limitation of previously presented claim 31: “wherein if the change notification indicates that changes that affect the cached data have been made, then the requested file data is obtained from the storage device”

(C) The limitation of previously presented claim 35: “wherein the change notification identifies changes to data associated with the second node, and wherein the change notification is communicated to the first node by publishing the change notification via the second node”

In claim 35, the requirement “wherein the storage device is a shared storage device between the first node and the second node” has been inserted immediately after the requirement “said system comprising a plurality of first nodes and a second node coupled to one another over a communications pathway” for ease of understanding. As a result of this and other requirements, the redundant limitations “wherein the storage device coupled to the second node is also coupled

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to the first node" wherein the storage device is directly coupled to the first node and the second node, and wherein the storage device is controlled by the second node" have been removed.

Applicants submit that independent claim 35 is in a condition for allowance.

Independent Claim 36

Applicants have rewritten claim 36 in independent form, including all of the limitations of the base claim 13 and the intervening claim 32, after removal of redundancies and grammatical errors, and certain rearrangement and/or changes to the claim language made for clarity. Amended claim 36 is as follows:

A digital data processing system, comprising:
a first node and a second node coupled for communication;
a storage device coupled for communication with at least the first node; and
a cache memory coupled to and associated with the first node, the cache memory caching administrative data pertaining to files on the storage device, wherein the second node notifies the first node of changes to the cached administrative data by publishing a change notification that indicates the changes affecting the cached administrative data, and wherein if the change notification indicates that changes that affect the cached administrative data have been made, then a file data requested by the first node is obtained from the storage device.

The requirements of claim 36 of "a cache memory coupled to and associated with the first node, the cache memory caching administrative data pertaining to files on the storage device, wherein the second node notifies the first node of changes to the cached administrative data by publishing a change notification that indicates the changes affecting the cached administrative data, and wherein if the change notification indicates that changes that affect the cached administrative data have been made, then a file data requested by the first node is obtained from the storage device." in combination with other requirements concisely expresses the following limitations by removing redundancies:

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(A) The limitation of previously presented claim 13:

“a cache memory coupled to and associated with the first node, the cache memory storing administrative data pertaining to files on the storage device, the second node notifying the first node of changes to administrative data pertaining to files for which the cache memory stores administrative data.

(B) The limitation of previously presented claim 32: “wherein in response to receiving a communication of the changes to the administrative data, the first node accesses the file from the storage device if the first node determines not to apply said cached data for accessing the file”

(C) The limitation of previously presented claim 36: “wherein a change notification identifies changes to data associated with the second node, and wherein the change notification is communicated to the first node by publishing the change notification via the second node”.

Redundancies related to the sharing and/or coupling of the first node, the second node, and/or the storage device have been removed while rewriting the claim in independent form.

Applicants submit that independent claim 36 is in a condition for allowance.

Independent Claim 37

Applicants have rewritten claim 37 in independent form, including all of the limitations of the base claim 18 and the intervening claim 33, after removal of redundancies and grammatical errors, and certain rearrangement and/or changes to the claim language made for clarity. Amended claim 37 is as follows:

A method of sharing storage access in a digital data processing system having a first node and a second node coupled for communication and a storage device coupled for communication with at least the first node, the method comprising:

caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device;

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communicating, from the second node, a change notification to the first node, wherein the change notification indicates changes affecting the cached administrative data, and wherein the change notification is published by the second node to communicate the change notification to the first node;

receiving, by the first node, the communicated change notification;

determining, by the first node, whether to apply said cached administrative data for accessing a file;

accessing, by the first node, the file from the storage device if the first node determines not to apply said cached administrative data for accessing the file.

The following requirements of claim 37:

“communicating, from the second node, a change notification to the first node, wherein the change notification indicates changes affecting the cached administrative data, and wherein the change notification is published by the second node to communicate the change notification to the first node;

receiving, by the first node, the communicated change notification;

determining, by the first node, whether to apply said cached administrative data for accessing a file;

accessing, by the first node, the file from the storage device if the first node determines not to apply said cached administrative data for accessing the file”;

in combination with other requirements concisely express the following limitations by removing redundancies:

(A) The limitation of previously presented claim 18:

“communicating, to the first node, changes to administrative data
pertaining to files for which the cache memory stores administrative data; and

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determining, in the first node, whether to apply said cached data for accessing a file thereby reducing network communications”

(B) The limitation of previously presented claim 33: “wherein in response to receiving a communication of the changes to the administrative data, the first node accesses the file from the storage device if the first nodes determines not to apply said cached data for accessing the file”.

(C) The limitation of previously presented claim 37: “wherein a change notification identifies changes to data associated with the second node, and wherein the change notification is communicated to the first node by publishing the change notification via the second node”.

Redundancies related to the sharing and/or coupling of the first node, the second node, and/or the storage device have been removed while rewriting the claim in independent form.

Applicants submit that independent claim 37 is in a condition for allowance.

Independent Claim 38

Applicants have rewritten claim 38 in independent form, including all of the limitations of the base claim 19 and the intervening claim 34, after removal of redundancies and grammatical errors, and certain rearrangement and/or changes to the claim language made for clarity. Amended claim 38 is as follows:

A method for accessing information stored on a storage device, wherein the storage device is shared by a plurality of first nodes and a second node, wherein the plurality of first nodes and the second node communicate over a communications pathway, wherein the second node is coupled to the storage device for determining meta data for accessing file data in the storage device, and wherein the first nodes are configured for accessing file data from the storage device using said meta data, the method comprising:

 caching meta data for a file accessed by a first node in a cache memory of said first node;

 providing a file application on said first node configured to get requested file data

 utilizing said cached meta data;

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storing file change notifications at said first node indicating changes that may affect the cached data, and wherein said file change notifications are communicated to the first node by publishing the file change notifications via the second node; and

determining, based on said file change notifications, whether said file application may utilize the cached meta data for a requested file or whether said file application accesses the requested file from the storage device, wherein if the file change notifications indicate that changes that affect the cached meta data have been made, then the requested file is obtained from the storage device coupled to the second node.

The requirements of claim 38 of:

“providing a file application on said first node configured to get requested file data utilizing said cached meta data;

storing file change notifications at said first node indicating changes that may affect the cached data, and wherein said file change notifications are communicated to the first node by publishing the file change notifications via the second node; and

determining, based on said file change notifications, whether said file application may utilize the cached meta data for a requested file or whether said file application accesses the requested file from the storage device, wherein if the file change notifications indicate that changes that affect the cached meta data have been made, then the requested file is obtained from the storage device coupled to the second node.” in combination with other requirements concisely express the following limitations by removing redundancies:

(A) The limitation of previously presented claim 19: “providing a file application on said first node configured to get requested file data utilizing said cached data;

storing file change notifications at said first node indicating changes that may affect the cached data; and

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determining, based on said change notifications, whether said file application may utilize the cached data for a requested file or whether said file application accesses the requested file from the storage device”.

(B) The limitation of previously presented claim 34: “wherein if the change notifications indicate that changes that affect the cached data have been made, then the requested file is obtained from the storage device”.

(C) The limitation of previously presented claim 38: “wherein the change notifications identify changes to data associated with the second node, and wherein the change notifications are communicated to the first node by publishing the change notifications via the second node”.

Redundancies related to the sharing and/or coupling of the first node, the second node, and/or the storage device have been removed while rewriting the claim in independent form by including the requirement “wherein the storage device is shared by a plurality of first nodes and a second node” among other requirements after the requirement “A method for accessing information stored on a storage device” .

Applicants submit that independent claim 38 is in a condition for allowance.

Obviousness rejections

The Examiner rejected pending claims 1-34 under 35 U.S.C. §103 as being obvious over Vahalia (US 6,389,420) in view of Banga (US Patent Application No. 2001/0020248).

Applicants traverse the rejections.

Claim 1

The Examiner has rejected claim 1 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga (Office Action: pages 2-3).

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Pending independent claim 1 requires a digital data processing system with improved access to information stored on a storage device, said system comprising a plurality of first nodes and a second node coupled to one another over a communications pathway, the second node being coupled to the storage device for determining meta data including block address maps to file data in the storage device, and the first nodes being configured for accessing file data from the storage device using said meta data, wherein said system comprises:

at least one first node that caches data including meta data for a file accessed by said first node;

a file application on said first node configured to get requested file data by accessing said cached data for the file; and

a file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node inspects the change notification and based on the change notification determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first and the second node, wherein file accesses may be effected for an extended time with data locally cached at first nodes of the digital data processing system.

The Examiner has responded to the some of the Applicants arguments by mentioning that both the cited Banga (Banga: fig 5: 0070-0071 of pages 6-7) and the cited Vahalia (col. 10: lines 3-16; fig. 7) discuss the claim requirement of a file application that sends a file change notification to the first node indicating changes affecting the cached data. Applicants had indicated many other requirements of claim 1, that were neither taught or suggested by the cited Banga or the cited Vahalia and the Examiner has not addressed those requirements. For example, the applicants submitted that nowhere does the cited Vahalia or the cited Banga teach or suggest the claim requirements that based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to

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get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node. Applicants respectfully request the Examiner to provide a response indicating where in the cited Vahalia or the cited Banga the claim requirement that "based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node" is either taught or suggested.

Additionally the cited Banga (fig 5: 0070-0071 of pages 6-7) describes communication between a remote proxy and a local proxy regarding whether a cached data is current. Nowhere does the cited Banga (fig 5: 0070-0071 of pages 6-7) teach or suggest the claim requirement that "based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node". In the cited Banga the remote proxy sends the current version to the local proxy, whereas the claims require "the first node to determine whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node" and this requirement is not taught or suggested by the cited Banga.

Furthermore, the cited Vahalia (col. 10: lines 3-16; fig. 7) discusses modifications to metadata and access based on modifications to the metadata. Nowhere does the cited Vahalia teach or suggest the claim requirement that "based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node."

For the above reasons, nowhere does the cited Vahalia (in the Examiner's response to arguments) teach or suggest the claim requirement that "based on the change notification, the file

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application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node”.

Additional reasons for the patentability of claim 1 are provided below:

Nowhere does the cited Vahalia or the cited Banga teach or suggest the claim requirements that based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node.

The cited Banga (21-27 of Fig. 2; 0058-0060 of page 5) discusses getting data either from a cache or from a remote proxy. Nowhere does the cited Banga teach or discuss the claim requirement where the change notification is the basis for getting the cached data or data from the storage device. The difference data (elements 26, 27 of FIG. 2) in the cited Banga is different from the change notification of the claim requirements. The difference data discussed in Banga (paragraphs 25, 25 of Banga) is the difference in content between two pages. The claims require the change notification to indicate changes affecting the cached data. The difference in content between two pages (difference data) of the cited Banga is different from changes affecting the cached data (change notification) as required by the claims. Therefore the cited Banga does not teach or suggest the claims requirement that based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device. The Examiner acknowledges that the cited Vahalia does not teach or suggest the claim requirements that based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device.

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Furthermore, in the cited Banga (FIG. 2) the local proxy secures data from the remote proxy based on whether the page is cached (Banga: FIG. 2, element 21) and on the validity of cached version (Banga: FIG. 2, element 23). While the cited Banga discusses that the local proxy may have received instructions from the browser that the local proxy should not use the cached page, such instructions from the browser are different from the change notification required by the claims.

Furthermore, the cited Banga discusses a browser, a local proxy, and a remote proxy. Without prejudice to the applicants position that the instructions from the browser discussed in the cited Banga are different from the change notification required by the claims, even if for the sake of argument the instructions from the browser are the same as the change notification, the browser discussed in Banga corresponded to the file notification system required by the claims, the local proxy discussed in Banga corresponded to the first node required by the claims, and the remote proxy discussed in Banga corresponded to the second node required by the claims, then the cited Banga discusses that the first node (local proxy discussed in the cited Banga) requests data from the second node (remote proxy discussed in the cited Banga) and receives data from the second node. Therefore, the cited Banga does not teach or suggest the claim requirement that the first node determines getting the requested file data from the storage device, where the storage device is a shared storage device between the first node and the second node.

Additional reasons for the patentability of the claim are given below:

Applicants conclude from the Examiner's acknowledgments of the deficiencies of the cited Vahalia, that the cited Vahalia does not teach or suggest the claims requirements of a file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node inspects the change notification and based on the change notification determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage

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device, whereby file accesses may be effected for an extended time with data locally cached at first nodes of the system.

The cited Banga (58, 59 of FIG. 5; 0025 of page 2, 0062 of page 5-6) discusses a first node (local proxy) connected to a second node (remote proxy). In the cited Banga the second node (remote proxy) sends a response to the first node (local proxy) and the first node (local proxy) receives and processes the response (27 of FIG. 2, FIG. 3, 0062 of page 5-6). However, the cited Banga does not teach or suggest the claim requirement of determining on the first node, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device. The cited Banga teaches away from the claim requirement of determining whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device. In the cited Banga, the first node on receiving the response from the second node either returns the current version of the requested file from the cache or awaits transmission of the difference data. The transmission of the difference data from the second node (remote proxy) to the first node (local proxy) as discussed in the cited Banga is different from the claim requirement of the first node determining whether to get the requested file data from the storage device. In the cited Banga, the first node (local proxy) just waits for getting the difference data from the second node (remote proxy). The claims require the first node to determine whether to get the requested file data from the cached data or from the storage device coupled to the second node. Additionally, the cited Banga discusses that the first node waits for the difference data. However, the difference data discussed in the cited Banga is may only be a part of requested file data of the claim requirements and not be the requested file data.

Therefore, neither the cited Vahalia nor the cited Banga teach or suggest the claim requirements a file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node inspects the change notification and based on the change notification determines, whether to get

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the requested file data directly using said cached data or whether to get the requested file data from the storage device, whereby file accesses may be effected for an extended time with data locally cached at first nodes of the system, wherein the storage device is a shared storage device between the first node and the second node.

For the above reason, claim 1 is patentable over the cited art, either alone or in combination.

Claims 2-12

The Examiner has also rejected pending claims 2-12 that depend directly or indirectly on independent claim 1 which is patentable over the cited art for the reasons discussed above. Moreover, the following of these claims provide additional grounds of patentability over the cited art for the reasons discussed below.

Claim 2

Pending claim 2 depend from claim 1, and add the requirement that the file application on said first node determines whether requested file data is subject to a change notification, and if so makes a further determination whether cached data at said first node remains valid for the requested file data.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 2 are discussed.

The Examiner has cited the abstract of Vahalia in rejecting claim 2. The abstract of Vahalia discusses exchange of locks between a first node and a second node and the accessing of data based on the lock. Nowhere does the cited abstract of Vahalia teach or suggest the claim requirement of determining whether the requested file data is subject to a change notification.

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Accordingly claim 2 provides additional grounds of patentability over the cited art.

Claim 3

Pending claim 3 depends from claim 1, and adds the requirement that the file application on said first node,

- i) determines whether requested file data is subject to a change notification, and
- ii) applies the cached meta data to directly mount the storage device to access the requested file when the cached data is not subject to a change notification.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 3 are discussed.

In the cited Vahalia (68 of FIG. 7, 70, 72 of FIG. 7) step 68 is performed if the first node has modified the metadata. The claims require the file application of the first node to determine whether requested file data is subject to a change notification and nowhere does the cited Vahalia teach or suggest the claim requirement.

Accordingly, claim 3 is patentable over the cited art.

Claim 7

Independent claim 7, depends on claim 1, wherein the file notification system runs on the second node and interfaces with a file system meta data controller to detect changes in file system storage data, issuing a file change notice in response thereto.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 7 are discussed.

The cited Vahalia (col. 22, lines 37 - col. 23, lines 42) refer to software for the first node (client of Vahalia: Vahalia col. 22, line 37) and procedure followed by the first node's operating

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system (col. 22, line 67). The claims require the file notification system to run on the second node and nowhere does the cited Vahalia teach or suggest the file notification system to run on the second node.

Therefore, claim 7 is patentable over the cited art.

Claim 8

Pending claim 8 depends from claim 1, wherein the file notification system limits number of change notifications for a given file to first n changes that occur, where n is a positive integer.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 8 are discussed.

The cited Vahalia (col. 15, lines 32 to col. 16 lines 41) discusses locks does not require change notifications as required by the claims. Furthermore, the cited Vahalia does not teach or suggest a numerical limit (because n is an integer in the claims) on the number of change notifications.

Therefore, claim 8 is patentable over the cited art.

Claim 9

Claim 9 depends from claim 1, wherein the file application on the first node implements a decision algorithm to determine whether to apply cached data for a requested file when the requested file is subject to a change notification.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 9 are discussed.

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Nowhere does the cited Vahalia (67-72 of FIG. 7) teach or suggest that the requested file is subject to change notification as required by the claims. Block 67 of the cited Vahalia discusses whether the client has modified the metadata. This is different from the change notification as required by the claims. The cited Vahalia discusses whether the first node has changed the metadata, whereas the claims require a change notification to be examined at the first node.

Therefore claim 9 is patentable over the cited art.

Claim 11

Claim 11 depends from claim 10, wherein the file system management tasks performed by the second node include publication of change data.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 11 are discussed.

The cited Vahalia (col. 9, lines 49-58) discusses granting locks and comparison of metadata version numbers. Nowhere, does the cited Vahalia teach or suggest the file system management tasks performed by the second node include publication of change data.

Therefore claim 11 is patentable over the cited art.

Claims 13, 15-17, 18-24, and 26

The Examiner has rejected claims 13, 15-17, 18-24 and 26 based on the analysis of claim 1-7, and 9-12 and Applicant traverses the rejections based on the above arguments for claims 1-7 and 9-12. Moreover, the following of these claims provide additional grounds of patentability over the cited art for the reasons discussed below.

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Claim 13

The Examiner has rejected claim 13 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga. Applicants traverse.

Pending independent claim 13 is a digital data processing system, comprising a first node and a second node coupled for communication:

a storage device coupled for communication with at least the first node; and

a cache memory coupled to and associated with the first node, the cache memory storing administrative data pertaining to files on the storage device,

the second node notifying the first node of changes to administrative data pertaining to files for which the cache memory stores administrative data.

The Examiner has responded to the some of the Applicants arguments by mentioning that both the cited Banga (Banga: fig 5: 0070-0071 of pages 6-7) and the cited Vahalia (col. 10: lines 3-16; fig. 7) discusses the claim requirement of a file application that sends a file change notification to the first node indicating changes affecting the cached data. The cited Banga (fig 5: 0070-0071 of pages 6-7) describes communication between a remote proxy and a local proxy regarding whether a cached data is current. Nowhere does the cited Banga (fig 5: 0070-0071 of pages 6-7) teach or suggest the claim requirement that changes to administrative data pertaining to files are notified. In the cited Banga the remote proxy sends the current version to the local proxy, whereas the claims require changes to administrative data to be sent and this requirement is not taught or suggested by the cited Banga.

Furthermore, the cited Vahalia (col. 10: lines 3-16; fig. 7) discusses modifications to metadata and access based on modifications to the metadata. Nowhere does the cited Vahalia teach or suggest the claim requirement of "the second node notifying the first node of changes to administrative data pertaining files".

For the above reasons, nowhere does the cited Vahalia (in the Examiner's response to arguments) teach or suggest the claim requirement of the second node notifying the first node of

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changes to administrative data pertaining to files for which the cache memory stores administrative data.

Additional reasons for patentability are provided below.

Neither the cited Vahalia nor the cited Banga teach or suggest the claim requirement of the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data.

It can be concluded from the Examiner's acknowledgments that the cited Vahalia does not discuss the claim requirement of the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data.

Nowhere does the cited Banga discuss the claim requirement of the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data. The cited Banga (58, 59 of FIG. 5; 0025 of page 2, 0062 of page 5-6) discusses a first node (local proxy) connected to a second node (remote proxy). In the cited Banga the second node (remote proxy) sends a response to the first node (local proxy) and the first node (local proxy) receives and processes the response (27 of FIG. 2, FIG. 3, 0062 of page 5-6). However, the cited Banga does not teach or suggest the claim requirement of notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data. Banga discusses sending a "mime" multi-part message from the second node to the first node which is different from the claim requirements of the changes to administrative data pertaining to files. Banga discusses that the first node determines whether or not the first part of the multi-part message from the second node identifies the transmitted data from the first node as a stale version of the requested page (0062 of the cited Banga). However, the claims require the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data. Therefore, the multi-part message of the cited Banga is different from the administrative data of the claim requirements.

Therefore claim 13 is patentable over the cited art, either alone or in combination.

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Claim 18

The Examiner has rejected claim 18 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga. Applicants traverse.

Pending independent claim 18 is a method of sharing storage access in a digital data processing system having a first node and a second node coupled for communication and a storage device coupled for communication with at least the first node, the method comprising:
caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device;

communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data; and

determining, in the first node, whether to apply said cached data to reduce network communications for accessing a file.

The Examiner has responded to the some of the Applicants arguments by mentioning that both the cited Banga (Banga: fig 5: 0070-0071 of pages 6-7) and the cited Vahalia (col. 10: lines 3-16; fig. 7) discuss the claim requirements of a file application that sends a file change notification to the first node indicating changes affecting the cached data. The cited Banga (fig 5: 0070-0071 of pages 6-7) describes communication between a remote proxy and a local proxy regarding whether a cached data is current. Nowhere does the cited Banga (fig 5: 0070-0071 of pages 6-7) teach or suggest the claim requirement of caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device, and communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data to reduce network communications for accessing a file.

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Furthermore, the cited Vahalia (col. 10; lines 3-16; fig. 7) discusses modifications to metadata and access based on modifications to the metadata. Nowhere does the cited Vahalia teach or suggest the claim requirement of "caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device, and communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file"

For the above reasons, nowhere does the cited Vahalia (in the Examiner's response to arguments) teach or suggest the claim requirement of caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device, and communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data to reduce network communications for accessing a file.

Additional reasons for patentability are provided below.

Neither the cited Banga nor the cited Vahalia teach or suggest the claim requirement of caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device, and communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file.

It can be concluded from the Examiner's acknowledgments that the cited Vahalia does not discuss the claim requirement of communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file.

Nowhere does the cited Banga discuss the claim requirement of communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for

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accessing a file. The cited Banga (58, 59 of FIG. 5; 0025 of page 2, 0062 of page 5-6) discusses a first node (local proxy) connected to a second node (remote proxy). In the cited Banga the second node (remote proxy) sends a response to the first node (local proxy) and the first node (local proxy) receives and processes the response (27 of FIG. 2, FIG. 3, 0062 of page 5-6). However, the cited Banga does not teach or suggest the claim requirement of communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file. Banga discusses sending a "mime" multi-part message from the second node to the first node which is different from the claim requirements of the changes to administrative data pertaining to files. Banga discusses that the first node determines whether or not the first part of the multi-part message from the second node identifies the transmitted data from the first node as a stale version of the requested page (0062 of the cited Banga). However, the claims require that the second node to send administrative data pertaining to files whose administrative data is stored in the cache of the first node. Therefore, the multi-part message of the cited Banga is different from the administrative data of the claim requirements.

For the above reason, claim 18 is patentable over the cited art.

Claim 19

The Examiner has rejected claim 19 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga.

Amended independent claim 19 is a digital data processing method for improved access to information stored on a storage device, wherein the system includes a storage device, a plurality of first nodes and a second node communicating over a communications pathway, the second node being coupled to the storage device for determining meta data for accessing file data in the storage device, and the first nodes being configured for accessing file data from the storage device using said meta data, wherein said method is characterized by the steps of:

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 caching meta data for a file accessed by said first node in a cache memory of said first node;

 providing a file application on said first node configured to get requested file data utilizing said cached data;

 storing file change notifications at said first node indicating changes that may affect the cached data; and

 determining, based on said change notifications, whether said file application may utilize the cached data for a requested file or whether said file application accesses the requested file from the storage device, wherein the storage device is a shared storage device between the first node and the second node.

The Examiner has rejected claim 19 based on the analysis of claim 1-7, and 9-12. Applicant maintains the patentability of amended claim 19 based on the arguments in support of amended claim 1, and claims 6-7, 9-12.

For the above reasons claim 19 is patentable over the cited art, either alone or in combination.

Claim 25

Examiner appears not to have indicated specifically why claim 25 has been rejected.

Claims 27-30

Amended claims 27-30 requires that the file notification system runs on the second node and sends the file change notification to the first node, wherein the first node is registered with the second node for receiving the file change notification, wherein the file change notification includes changes to the data and the meta data.

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The cited Banga (58,59 of fig. 5; and 0069, 0070 of page 6) discuss difference data which is different from the file change notification as required by the claims. Furthermore, in the cited Banga the first node (local proxy) can possibly be registered with the browser and not the second node (the remote proxy) for receiving any type of change notification because in the cited Banga the browser advises the local proxy whether the cached data is current. Therefore, the cited Banga does not teach or suggest the claim requirement that the first node (local proxy) is registered with the second node (remote proxy) for receiving the file change notification. In the cited Banga, the browser and not the remote proxy advises the first node (local proxy).

For the above reasons claims 27-30 is patentable over the cited art, either alone or in combination.

Claims 31-34

Amended claim 31, is the data processing system of claim 1, wherein if the change notification indicates that changes that affect the cached data have been made, then the requested file data is obtained from the storage device coupled to the second node, wherein the storage device coupled to the second node is also coupled to the first node.

The Examiner has rejected claims 31-34 by citing FIG. 1 of Banga and mentioned that the file data is obtained from the network to the network service provider before forwarding to the user station. Therefore, in the cited Banga, the file data is obtained from the network which is not coupled to the user station/local proxy (first node). The claims require storage device from which the data is obtained to be also coupled to the first node. Therefore, the cited Banga discusses obtaining the data at the first node from the storage device that is not coupled to the first node but is only coupled to the second node, whereas the claims require obtaining the data at the first node from the storage device that is coupled to both the first node and the second node.

Therefore, claims 31-34 are patentable over the cited art because the cited art does not teach or suggest, either alone or in combination, all the claims limitations.

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New Claims 39-42

The added requirements of new claims 39-42 may be found in at least lines 16-24 of page 5 of the specification, 3rd paragraph (beginning "The network pathways...") of page 9 of the specification, FIG. 1 (elements 36, 16, 20), and in pages 9-20 of the specification.

Conclusion

For all the above reasons, Applicant submits that the pending claims 1-42 are patentable over the art of record. Applicants have indicated appropriate fees to be charged. Nonetheless, should any additional fees be required, please charge Deposit Account No. 50-0585.

The attorney/agent invites the Examiner to contact him at (310) 557-2292 if the Examiner believes such contact would advance the prosecution of the case.

Dated: January 10, 2004

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